

2bH5

29. (Thrice Amended) A method for producing thermo-mechanical pulp from lignocellulose fiber-containing feed material comprising the steps of:

first conditioning said fiber containing feed material in an environment of saturated steam at a pressure in the range of about 15-25 [psi] psig to produce a conditioned feed material;

new matter

subsequently compressing said conditioned feed material in a screw press in an environment of saturated steam at a pressure in the range of about 15-25 [psi] psig at a compression ratio of at least about 4:1 to destructively said fibers;

subsequent to the step of compressing, preheating the destructured material in an environment of saturated steam; and

immediately following the step of preheating, refining said material to form lignocellulose pulp.

D<sup>2</sup>

1bE1

31. (Twice Amended) A method for producing thermo-mechanical pulp in a primary disc refiner from lignocellulose fiber-containing feed material comprising the steps of:

first conditioning said fiber containing feed material in an environment of steam at an elevated pressure in the range of about 15-25 [psi] psig to produce a conditioned feed material at a temperature [in the range of about 90-120] above 100 deg. C;

new matter

directly thereafter compressing said conditioned feed material in an environment of steam at an elevated pressure in the range of about 15-25 [psi] psig to destructure said fibers at a temperature [in the range of about 90-120] above 100 deg. C without significant breakage across grain boundaries;

preheating the destructured material in an environment of saturated steam at a pressure higher than the pressure of the environment at which the material was destructured; and

D<sup>3</sup>

① 3 conveying the preheated material to the inlet of a primary disc refiner operating at a higher pressure than the pressure of the environment at which the material was destructured.

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DE 36 (Twice Amended) A method for producing thermo-mechanical pulp in a primary disc refiner from lignocellulose fiber-containing feed material comprising the steps of:

① 4 first conditioning said fiber containing feed material in an environment of saturated steam at an elevated pressure in the range of about 10-25 psig to produce a conditioned feed material at a temperature [in the range of about 90-120] above 100 deg. C without significant breakage across grain boundaries; *new after*

preheating the destructured material in an environment of saturated steam at a pressure above the glass transition temperature of the lignin in the material, for a period of time less than 30 seconds;

conveying the preheated material to the inlet of a primary disc refiner operating at a temperature above the glass transition temperature of the lignin; and

refining the material at a disc speed of rotation that is greater than 1500 rpm for a double disc refiner or greater than 18000 rpm for a single disc refiner.

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#### REMARKS

Applicant thanks for Examiner for the courtesy extended in connection with the personal interview attended by the undersigned and the inventor. At the interview, applicant showed the Figure from the Cederquist patent (U.S. 4,136,831) annotated to show the pressure in the various components as described therein. A copy is attached hereto as Exhibit 1. In Cederquist, the material undergoes conventional pre-steaming at atmospheric conditions, in vessel 2. The chips